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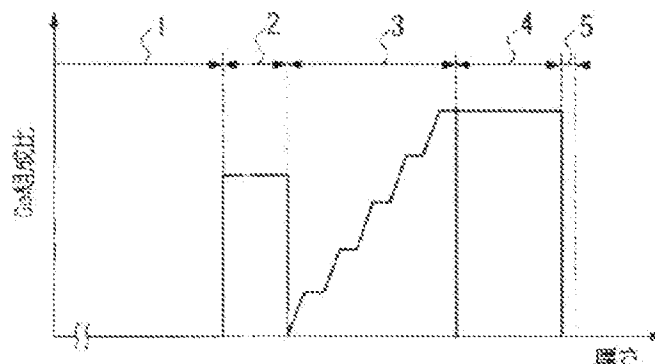
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H01L 29/78

TITLE : SEMICONDUCTOR SUBSTRATE,  
FIELD EFFECT TRANSISTOR, AND  
THEIR MANUFACTURING METHODS



ABSTRACT : PROBLEM TO BE SOLVED: To lower threading dislocation density and to reduce surface roughness to a practical level and, at the same time, on a semiconductor substrate, a field effect transistor, and methods of manufacturing the substrate and the transistor.

SOLUTION: The semiconductor substrate is provided with a Si substrate 1, a first SiGe layer 2 formed on the substrate 1, and a second SiGe layer 3 formed on the layer 2 directly or through an Si layer. The first SiGe layer 2 has a thickness which is smaller than the twice of a critical film thickness at which lattice relaxation occurs due to a dislocation caused as a film thickness increases. The second SiGe layer 3 is constituted by alternately laminating inclined SiGe-composition layers in each of which the percentage composition of Ge increases as going toward the surface, and fixed SiGe-composition layers arranged on the inclined SiGe-composition layers at the percentage compositions of Ge in the upper surfaces of the inclined SiGe-composition layers at a continuous percentage composition of Ge. The percentage composition of Ge on the lower surface of the second SiGe layer 3 is lower than the maximum value of the percentage composition of Ge in the first SiGe layer 2.

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